REMARKS

Applicants are amending their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants are amending claim 1 to recite that the electroconductive ultrafine powder is in the form of a sphere having a particle diameter in the range of 1-100 nm, or is the form of a spheroid or acicular each having a minor axis in the range of 1-100 nm. Applicants have further amended claim 1 to recite that the electroconductive ultrafine powder has "a fired or sintered" insulating film on the electroconductive ultrafine powder. In connection with this insulating film, note, for example, the paragraph bridging pages 9 and 10 of Applicants' specification. In light of amendments to claim 1, Applicants have amended claim 5 to recite respective diameters and minor axis of the sphere and of the spheroid or acicular. Moreover, in light of amendments to claim 1, Applicants have amended claim 16 to recite that the diameter or the minor axis is in the range of 5nm - 70nm.

Initially, it is respectfully requested that the present amendments be entered. Noting, in particular, the paragraph bridging pages 9 and 10 of Applicants' specification, as well as previous arguments made, it is respectfully submitted that the present amendments do not raise any new issues, including any issue of new matter. Moreover, by further defining the insulating film, and by providing further distinctions between the applied prior art, as discussed infra, and the present invention, it is respectfully submitted that the present amendments materially limit issues remaining in connection with the above-identified application, at the very least presenting the claims in better form for appeal. Noting the new references applied by the Examiner in the Office Action dated July 16, 2007, it is respectfully submitted that the present amendments are clearly timely.

In view of the foregoing, it is respectfully submitted that Applicants have made the necessary showing under 37 C.F.R. §1.116(b)(3); and that, accordingly, entry of the present amendments is clearly proper.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner on the merits, patentably distinguish over the teachings of the prior art applied by the Examiner in rejecting claims in the Office Action dated July 16, 2007, that is, the teachings of U.S. Patent No. 5,296,168 to Jacobson, and International (PCT) Application Publication No. WO 02/22757, under the provisions of 35 U.S.C. §102 and 35 U.S.C. §103.

Initially, it is noted that the Examiner has used U.S. Patent No. 6,992,431 to Ito, et al, as an English translation of the applied international published application. In the following, the undersigned follows the same procedure; and all reference hereinafter is to teachings of U.S. Patent 6,992,431 to Ito, et al, notwithstanding that the applied reference is the aforementioned International (PCT) Published Application.

It is respectfully submitted that the teachings of the applied references could have neither disclosed nor would have suggested such an insulated ultrafine powder as in the present claims, including, inter alia, wherein said insulated ultrafine powder has a fired or sintered insulating film on the electroconductive ultrafine powder, with the electroconductive ultrafine powder being made of a material selected from the group consisting of stannic oxide doped with antimony, indium trioxide doped with tin, zinc oxide doped with aluminum or gallium, and barium plumbate. See claim 1.

As will be shown further infra, it is respectfully submitted that Jacobson, disclosing electroconductive particles, would have neither disclosed nor would have suggested, and in fact would have taught away from, the insulated ultrafine powder

as in the present claims; and, moreover, neither of Ito, et al or Jacobson would have disclosed or would have suggested such insulated ultrafine powder having a fired or sintered insulating film on the electroconductive ultrafine powder.

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such insulated ultrafine powder as in the present claims, having features as discussed previously in connection with claim 1, and, additionally, wherein the insulating film has a relative dielectric constant of at least 20 (see claim 2); and/or wherein the insulating film includes at least one species selected from a group consisting of an oxide having insulating properties and a nitride having insulating properties (see claim 3); and/or wherein the insulating film has a thickness as in claim 5; and/or wherein the ultrafine powder is made of stannic oxide doped with antimony (see claim 12); and/or wherein the powder is an acicular having a minor axis in the range of 5-70nm (see claim 13) and an aspect ratio of 2-100 (see claim 14), more specifically an aspect ratio of 10-40 (see claim 15); and/or wherein the diameter or the minor axis is in the range of 5-70nm (see claim 16).

The present invention is directed to insulated ultrafine powder, well suited to the formation of an IC package, a module substrate, and an electronic part integrated with a high dielectric constant layer, particularly well suited to formation of an inner layer capacitor layer of a multi-layer system wiring substrate and also useful for miniaturizing built-in antennas and electro-magnetic adsorption sheets, units and panels which prevent electronic wave interference.

There has been proposed, as a high dielectric constant layer on a wiring substrate for removing high frequency noise, a resin composite material incorporated with at least 65 vol% of a ferroelectric material such as barium titanate as a high

dielectric constant filler, preferably forming a continuous layer of the high dielectric constant filler inside the composite material. This proposed composite has a relatively large amount of ferroelectric material, the reason for the necessity of such a large amount being set forth in the first paragraph on page 3 of Applicants' specification. However, with a composite containing such a large amount of ferroelectric material filler, processability and moldability are impaired.

Against this background, and as a result of extensive research and investigation made by the present inventors on formation of a continuous layer of a filler in a resin material, the present inventors have found that objectives of the present invention are achieved through use of an insulated ultrafine powder as in the present claims, having a fired or sintered insulating film on the electroconductive ultrafine powder, the electroconductive ultrafine powder having a shape and diameter/minor axis dimension in the present claims, and wherein such powder is made of a material selected from the group consisting of stannic oxide doped with antimony, indium trioxide doped with tin, zinc oxide doped with aluminum or gallium, and barium plumbate. Through use of materials for the electroconductive ultrafine powder as in the present claims, diffusion of metallic atoms from the ultrafine powder into media of an insulant, thereby lowering the insulating properties of the resin composite material formed using the ultrafine powder, can be avoided. Moreover, particularly desirable is stannic oxide doped with antimony, from the aspect of manufacturing cost. Note the sole full paragraph on page 5 of Applicants' specification.

Moreover, according to the present invention the insulating film on the electroconductive ultrafine powder is a fired or sintered insulating film. As described on page 9 of Applicants' specification, conventionally a porous insulating film was

formed, usually bringing above the condition in which the metal oxide as the insulating film does not wholly cover the surfaces of the electroconductive ultrafine powder. A vacancy when caused on the insulating film layer gives rise to such a problem as lowered dielectric constant. Such problem is avoided by the structure of the present invention, wherein the insulating film is a fired or sintered insulating film. By firing or sintering an insulating layer, the insulating film is provided without any clearance or vacancy; and, accordingly, by use of an insulating film as in the present claims, the insulating film having relative dielectric constant of at least 20 is formed without any clearance or vacancy.

As discussed infra, it is respectfully submitted that the fired or sintered insulating film defines structure, e.g., without any clearance or vacancy, and it is respectfully submitted that this structure must be considered in determining patentability of the presently claimed subject matter. See In re Luck, 177 USPQ 523, 525 (CCPA 1973).

Furthermore, by utilizing electroconductive ultrafine powder in the form as in the present claims, having a diameter/minor axis in a range of 1-100 nm, deteriorated electroconductivity due to quantum size effect can be avoided, while a failure in forming a continuous layer, where relatively small amounts of powder is included in the resin composite material, can be avoided. Note the paragraph bridging pages 5 and 6 of Applicants' specification.

In addition, through utilizing powder in an acicular form, less amount of power need be added to the resin composite material in order to form a continuous layer. Note the paragraph bridging pages 5 and 6 of Applicants' specification.

Furthermore, through use of an insulating film having a thickness as in various of the present claims, a desired insulating effect is achieved, without having an

adverse effect on the dielectric constant of the resin composite material formed utilizing such powder. See pages 6 and 7 of Applicants' specification.

Jacobson discloses an electroconductive powder composition comprising powder particles which are generally smaller than 1,000 microns and frequently tens of microns to sub-micron in size, having a surface coating layer of antimony-containing tin oxide which is conducting and an outer thin layer of a hydrous metal oxide having a thickness of from a partial molecular layer to 5 monomolecular layers, i.e., from about 5-30 angstroms, and an isoelectric point in the range of about 5-9. Note the paragraph bridging columns 1 and 2 of this patent. This patent discloses that the hydrous metal oxide contemplated for use in the invention is an essentially non-conducting oxide selected from the group consisting of alumina, magnesia, zirconia, titania and rare earth metal oxides. See column 2, lines 12-15. See also column 2, lines 23-29, disclosing that the particles have a very thin layer of an essentially non-conducting hydrous metal oxide without substantially reducing the conductivity of the original particle. Note also column 3, lines 35-41, disclosing that by coating the particles with a generally high isoelectric point hydrous oxide, it is possible to preserve the electroconductivity of the particle.

It is emphasized that Jacobson discloses electroconductive particles. In contrast, the present invention is directed to insulated ultrafine powder. Such insulated ultrafine powder is a property of the claimed powder, and must be considered in determining patentability. It is respectfully submitted that Jacobson would have neither taught nor would have suggested, and in fact would have taught away from, the insulated ultrafine powder of the present claims, and advantages thereof, or additional features of the present invention including wherein the insulating film has a relative dielectric constant of at least 20.

It is emphasized that Jacobson, et al is directed to adjusting the isoelectric point of the particles, without substantially reducing conductivity attributable to the antimony-containing tin oxide. Thus, the powder of Jacobson, et al is electroconductive. In contrast, the presently claimed powder is an insulated ultrafine powder. This difference in electroconductivity between the presently claimed powder and Jacobson, et al would strongly suggest that the insulating film for the present invention is structurally different from the metal oxide coating of Jacobson, et al. It is respectfully submitted that such difference between the insulating film according to the present invention and the metal oxide coating of Jacobson, et al, would be attributable to the fact that the insulating film of the present invention is a fired or sintered insulating film. Jacobson,et al, is completely silent about firing or sintering the metal oxide coating; and, moreover, in Example 1 of Jacobson, et al, in columns 5 and 6 thereof, the coated product was merely air dried at 120ºC (note column 5, lines 59-65). Thus, it is respectfully submitted that Jacobson, et al would have neither taught nor would have suggested the presently claimed invention, including the fired or sintered insulating film.

Ito, et al discloses a dispersion for preventing electrification, an antistatic film, and various devices having the antistatic film. The dispersion for preventing electrification comprises high-resistance fine particles having a specific resistivity of 10^6-10^9 Ω·cm as a primary component. See column 2, lines 3-6. In another embodiment, the high-resistance fine particles can include a core layer which is composed of at least one semiconducting substance selected from SnO_2, In_2O_3, Sb_2O_5 and ZnO_2 and covering layer which is formed on the core layer and composed of at least one insulating substance selected from SiO_2, TiO_2, Al_2O_3 and ZrO_2. Note column 2, lines 32-42. See also column 4, lines 14-21. Note also, for example,

Example 2 in column 6 of this patent, disclosing that the composite fine particle C was prepared by forming a covering layer (a thickness of 1 nm) of SiO_2 on the surface of fine ATO (antimony-tin-oxide) particle, by a sol-gel method.

It is respectfully submitted that Ito, et al, having a film formed by a sol-gel method would have a porous oxide film, the porosity of the oxide film reducing the dielectric constant. In contrast, according to the present invention, the insulating film is a fired or sintered insulating film, forming a dense film without any clearance or vacancy. It is respectfully submitted that Ito, et al would have neither taught nor would have suggested the presently claimed subject matter, including, inter alia, wherein the insulated ultrafine powder includes a fired or sintered insulating film on the electroconductive ultrafine powder, and advantages thereof; and/or other features of the present invention as discussed previously, and advantages thereof.

The rejection of claims 13 and 15 as obvious over the teachings of Jacobson, et al, set forth on pages 4 and 5 of the Office Action dated July 16, 2007, is noted. As contended previously, Jacobson, et al, disclosing electroconductive particles, would have neither taught nor would have suggested, and in fact would have taught away from, the insulated ultrafine powder of the present claims; and would also have neither taught nor would have suggested, and in fact would have taught away from, the fired or sintered insulating film on the electroconductive ultrafine powder, as in the present claims, and advantages thereof.

The contention by the Examiner in Item 2 on page 3 of the Office Action dated July 16, 2007, that Jacobson, et al "teaches an electroconductive powder composition", and that this reference "is anticipatory", is respectfully traversed. As set forth previously, the claims considered by the Examiner in the Office Action dated July 16, 2007, recited an insulated ultrafine powder; such recitation of insulated

ultrafine powder must be given weight in determining patentability. The teachings of Jacobson, et al would have taught away from an insulated ultrafine powder, Jacobson expressly and clearly describing an electroconductive powder composition.

The objection to claim 1 as set forth on page 2 of the Office Action dated July 16, 2007, is noted. It is respectfully submitted that by the present amendments to claim 1, such objection has been overcome.

In view of the foregoing comments and amendments, entry of the present amendments, and reconsideration and allowance of all claims presently in the application, are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 395.43509X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

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